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PICTURE OF THE MONTH

Tropical Storm Felice in Oklahoma

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The satellite and land-based radar photographs in figure 1* show tropical storm Felice over Oklahoma at 0754 CST on Sept. 17, 1970. The square at the upper left and the enlargement at the lower right in figure 1C outline the region of the storm as it appeared on the ATS 3 (applications technology satellite) photographs. Figure 1A shows well-defined spiral bands encircling the eye centered about 80 n.mi. southeast of Norman, Okla., as displayed by the NSSL (National Severe Storms Laboratory) WSR–57 (weather surveillance radar). Although tropical storms usually become disorganized shortly after moving over large landmasses, Felice retained a structure of well-defined bands while drifting across southeastern Oklahoma almost 400 n.mi. inland.

Photographic and digital data were collected with the NSSL 10-cm WSR–57 from 0645 to 1645 CST. Several ATS 3 photographs for this period were provided by the NESS (National Environmental Satellite Service), NOAA, Suitland, Md. In addition, two aircraft were used to observe the cloud and wind patterns. The first aircraft departed Norman at about noon and traveled between precipitation bands as much as possible before entering the eye. Three hours later, an instrumented aircraft was flown directly from Norman toward the eye of the storm to collect temperature, moisture, rainfall rate, and raindrop-size data.

Meteorologists [1] aboard the two aircraft described the storm after their return to Norman. Although the second penetration occurred 3 hr after the first, their accounts were similar and provided the following picture. An altocumulus and cirrus overcast and a curving, banded stratus undercast characterized the region between spiral rain bands, while moderate to heavy rains were experienced within the bands. A single stroke of lightning was encountered during the aircraft penetrations; radar indicated that precipitation extended to only 30,000 ft MSL. In the eye wall, moderate to heavy rain and light to moderate turbulence were experienced. Maximum wind speeds in this region were estimated to be 40 kt at 10,000 ft MSL, the flight level maintained by both aircraft. The maximum rainfall rate encountered was about 2 in./hr along the east side of the eye wall. In the eye, widely scattered light showers occurred with thin spots in the overcast. The ground was observed occasionally through the scattered to broken layer of banded and cyclonically curved low clouds. Felice was apparently still warm-core. Upper air data near the storm's center at 1800 CST on the previous day indicated that the storm was several degrees warmer than its environment up to 500 mb, and the aircraft penetration 21 hr later indicated that temperatures at 10,000 ft MSL average 2°C higher near the center than those at Norman.

Tropical storm Felice, providing Oklahoma radar operators with a rare view, developed about 310 n.mi. south of Panama City, Fla., on Monday afternoon of September 14. The next day, moving west-northwest at 12 to 15 kt across the Gulf of Mexico, Felice attained its greatest intensity with a maximum sustained wind speed of 65 kt when

*A comprehensive analysis of the meteorological data in this photograph and others of Felice is being undertaken by Dr. T. Fujita, University of Chicago.

[1] Leslie Lemon, Ensign, USESSA, on temporary assignment at NSSL and Lynn Cooper, Weather Science, Inc., Norman, Okla.

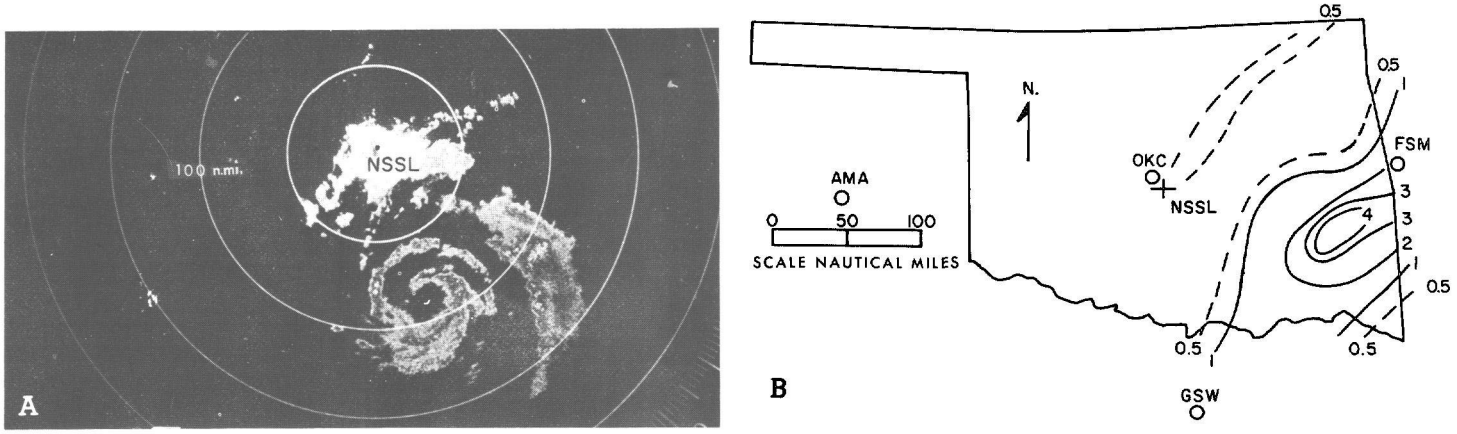

FIGURE 1.—(A) NSSL WSR–57 depiction of tropical storm Felice at 0754 CST on Sept. 17, 1970; (B) rainfall amounts (in inches) produced by Felice while moving across Oklahoma; the scale of (B) is the same as that of (A); and (C) the ATS 3 photograph of the earth's cloud patterns at 0754 CST; the square in the upper left corner and the enlargement at the lower right outline the region occupied by Felice.

located about 60 n.mi. southeast of Port Arthur, Tex. Later that day, after moving inland near the Louisiana-Texas coast, Felice turned northward and moved over central Texas on Wednesday. The storm drifted over southeastern Oklahoma on Thursday and gradually became weaker as the hourly radar sequence in figure 2 (p. 280) suggests. In Oklahoma, local rain fall amounts exceeded 4 in. (fig. 1B); and maximum wind speeds of 40 to 50 kt occurred near the eye. No lives were lost; and no serious injuries were reported, although some minor property damage occurred.

ACKNOWLEDGMENTS

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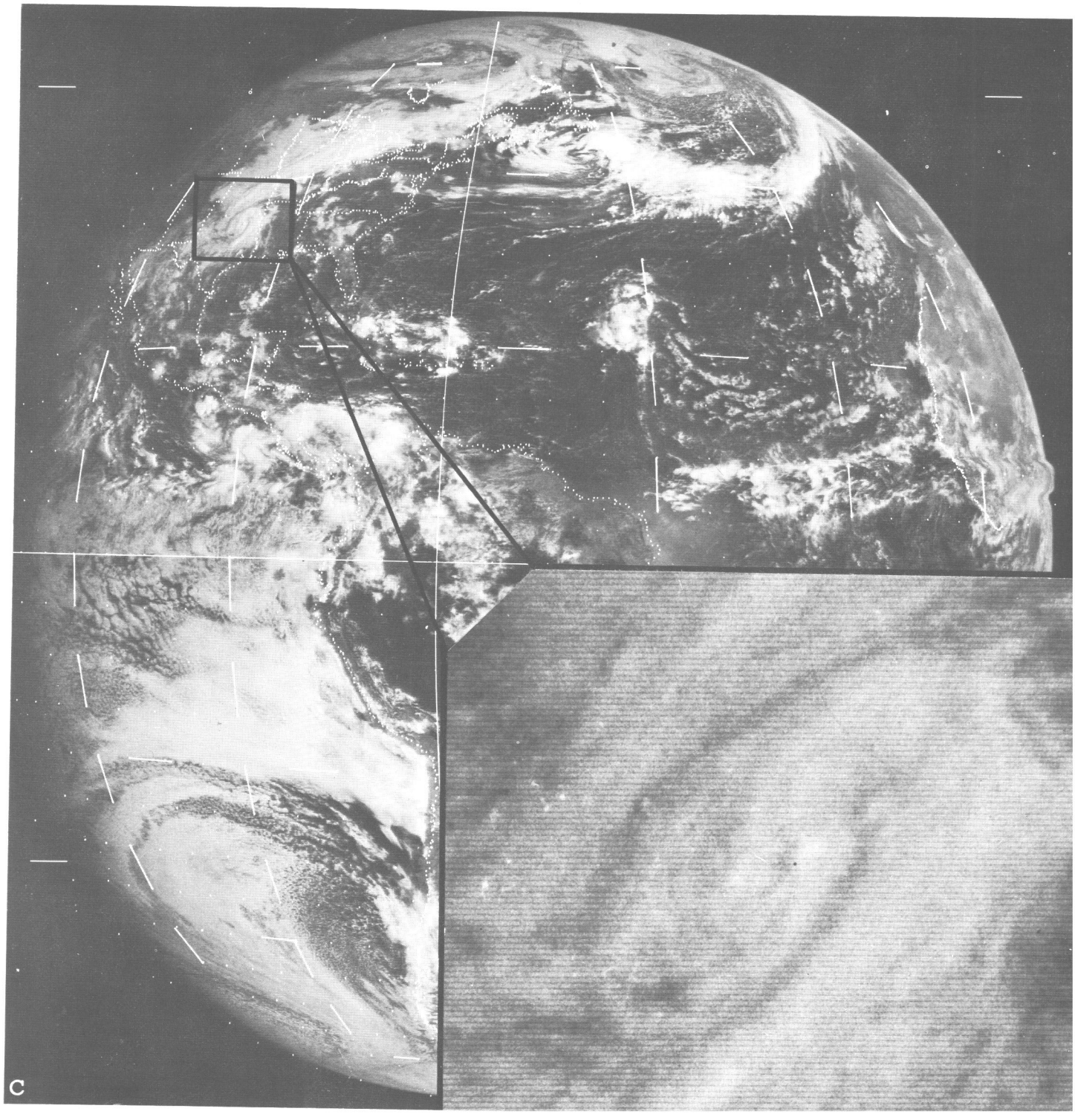

FIGURE 1.—Concluded.

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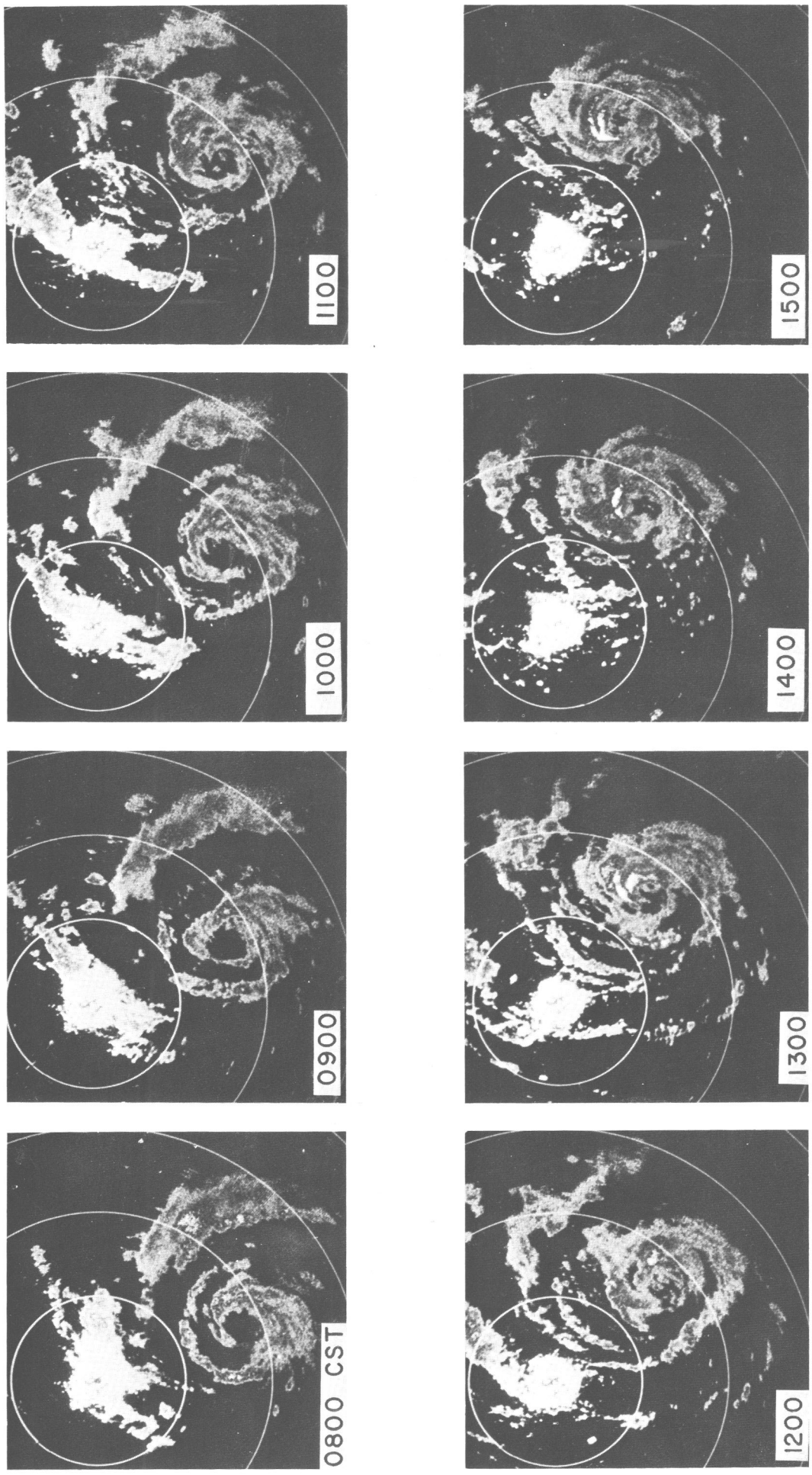

FIGURE 2.—Hourly radar sequence showing Felice over southeastern Oklahoma during the daylight hours on Sept. 17, 1970; all displays were photographed at a radar antenna elevation of 0°; the time of each presentation appears at the lower left in each photograph, and range marks appear at 25-n.mi. intervals; the contouring of the radar echoes represents values of log $Z_e \approx 1$, 3, and 4.